(9.2 ± 0.7 vs 11.3 ± 0.8, $p < 0.001$), and exercise time (375 ± 65 vs 571 ± 88 sec, $p = 0.003$) all improved during pacing-ON, but not pacing-OFF periods. Quality of life (QOL, Minnesota Living with Heart Failure) improved at 3 mos regardless of pacing mode ($p < 0.01$), indicating a placebo effect. However, by multiple comparisons test, QOL differed from baseline only during pacing-ON. LV dimensions and wall thickness did not significantly change. In 5 pts studied thus far after 6-mos of additional pacing, inducible cavity gradients by Doppler fell from 22 to 11 mmHg, exercise time remained longer (569 ± 124 sec, $p = 0.01$) and QOL improved ($p = 0.02$).

Conclusions: In a randomized blinded-study, VDD pacing improves exercise performance and QOL in symptomatic patients with hypertensive LVH receiving standard medical therapy.

11:15

888-4 Intermediate Results of Partial Left Ventriculectomy for Dilated Cardiomyopathy

R.C. Starling, J.B. Young, T. Buda, N. Smedira, M. Goormastic, P.M. McCarthy. *Cleveland Clinic Foundation, Cleveland, OH, USA*

Background: Partial left ventriculectomy (PLV) reduces left ventricular (LV) volume and increases ejection fraction (EF) but has been associated with high short term mortality in the U.S. and Brazil.

Methods: Since May 1996 we have performed PLV in 57 pts., 42 M 15 F, mean age 53 ± 14 years. Etiology was: 54 dilated cardiomyopathy, 1 familial, 1 valvular, and 1 ischemic. Pre-op the mean LV EF was 13.6 ± 6%, LVID 8.1 ± 1.0 cm, cardiac index 2.1 ± 0.6 l-min-sq m, and peak exercise oxygen consumption (MVO_2) 10.6 ± 4.0 ml/kg/min. 54 of 57 pts were listed for cardiac transplant and 40.4% were UNOS Status I, 61.4% were NYHA class 4 and 36.8% class 3.

Results: Mean weight of resected LV was 95 gm. The mitral valve was repaired in 55 and replaced in 2 pts. One year Kaplan-Meier survival is 82.1%. One year survival after cardiac transplant in a cohort of 175 pts with dilated cardiomyopathy at our institution was similar (87.3% p = 0.4). One year event free survival (freedom from death, mechanical support and/or transplant relisting) is 57.5%. MVO2, NYHA class, and LV EF improved significantly in event free survivors.

Conclusion: PLV provided event free survival in 58% of pts, improved their clinical status, and averted the need for transplant.

11:30

888-5 Partial Left Ventriculectomy: A Casuistry of 38 Cases

F.A. Lucchese, J.D. Frota Filho, C. Blacher, W. Pereira, J.A. Rosa, P. Leães, E. Lúcio, R. Batista. *Hospital São Francisco - Santa Casa de Porto Alegre, Brazil*

Partial Left Ventriculectomy (PLV) is a current surgical option in treating Refractory Heart Failure. In order to evaluate survival, quality of life and changes in cardiac dynamics 38 patients were operated on from december 94 to july 97. Mean age of 49 ± 14.7 years old, 25 males (65.7%) and 13 females (34.3%) were included according to the following criteria:dilated cardiomyopathy, NYHA functional class IV, contraindication for heart TX and poor quality of life. Additional procedures were: mitral bioprosthesis - 21 (61.7%), tricuspid annuloplasty - 12 (31.5%), mitral repair - 6 (15.7%) and CABG - 4 (10.8%). Associated conditions such as atrial fibrillation, tricuspid regurgitation, right sided failure and mitral regurgitation were present in a significant number of patients. At six months follow-up the decrease in cardiac dimensions, as measured in 14 consecutive patients, were consistent - diastolic (73.84 ± 8.25 to 65.33 ± 5.72 with p = 0.009) and systolic (65.50 ± 8.3 to 56.83 ± 5.74 with p = 0.007). Ejection Fraction increased but did not reach statistical significance. Left ventricular volumes decreased immediately -systolic (170.9 ± 36 to 74.9 ± 30.5 with p = 0.0002) and diastolic (254.9 ± 75.4 to 110.8 ± 43.9 with p = 0.0012). Early and late mortality were 21.5% and 42.1% respectively. Quality of Life and functional class improved (78.9% in NYHA class IV preoperatively versus 35.7% at six months postoperatively).

Conclusions: PLV results in better quality of life and survival is encouraging considering the graveness of this cohort.

11:45

888-6 Mitral Regurgitation Redilates the Left Ventricle After Partial Left Ventriculectomy (Batista Operation)

A.T. Kawaguchi[1], L. Bocchino[2], N. Takeshita[2], P.N. Lima[2], J.L. Verde[2], S. Koide[1], R.J. Batista[2]. [1]*Tokai University; Isehara, Japan;* [2]*Centro Medico Caron, Curitiba, Brazil*

Background: It remains unclear whether effects of Batista operation are attributable to volume reduction or to regained mitral competence.

Methods: Among patients undergoing Batista operation, 32 had Doppler echocardiography preoperatively, early (<3 months) and late after surgery (8 to 14 months). These patients were divided into groups with (MR+, n = 15) and without early postoperative MR (MR−, n = 17) and were compared for ventricular size and performance.

Results: Although MR+ group reduced LV end-diastolic dimensions (DD) similar to MR− group early after surgery (early-DD), they had the dimension dilated back to the preoperative level by the time of late study (Late-DD) while MR− group kept the dimension reduced (Table). Occurrence and severity of MR early after surgery (<3 months) did not appear to be related to severity of pre-existing MR, (Pre-MR; moderate = 2 mild = 1, none = 0), underlying pathology (%Myopathy), or performance of mitral valvuloplasty (%MVP) except for patients with papillary muscle resection followed by mitral valve replacement (%MVR), who had better postoperative mitral competence but poorer survival.

	Pre-DD	Early-DD	Late-DD	Pre-MR	%MVP	%Myopathy	%MVR
MR+	72.0	64.0	72.0	0.97	65.6	66.7	6.2
MR−	76.1	64.2	63.6	0.63	46.3	52.9	31.3
p =	NS	NS	0.05	NS	NS	NS	0.05

Conclusion: Early postoperative MR, residual or new, appeared to be playing an important role dictating early hemodynamics and late outcome in patients undergoing Batistaoperation. The results suggest an aggressive simultaneous approach to repair MR. Role of papillary muscle-mitral apparatus remains unclear and needs further studies.

889 Effects of Hypertension in the Left Ventricle

Wednesday, April 1, 1998, 2:00 p.m.–3:30 p.m.
Georgia World Congress Center, Room 255W

2:00

889-1 Left Ventricular Geometry and Function in Hypertensive Patients With ECG Left Ventricular Hypertrophy: The LIFE Trial

R.B. Devereux, J.N. Bella, B. Dahlof, E. Gerdts, M. Niemenen, J. Nielsen, V. Papademetriou. *For the LIFE Study Group; Cornell Medical Center, New York, NY, USA*

Background: Detection of LV hypertrophy (LVH) by ECG is inexpensive but its accuracy is controversial because of concerns about low ECG sensitivity.

Methods: Echocardiography was used to assess LV structure and function in 625 participants in the LIFE (Losartan Intervention For Endpoint reduction in hypertension) study with ECG LVH (Cornell voltage × duration >= 2,440 mm msec or SV1 + V5 or V6 >38 mm) (average BP 172/95, 39% women, 15% U.S., 85% European) and in comparison groups of 284 hypertensives from a population sample (NY-HTN) and 413 normal adults.

Results: LIFE patients had substantially higher LV wall thickness (1.10 vs 0.94 vs 0.78 cm), LV mass index (123 vs 94 vs 74 g/m^2), relative wall thickness (0.43 vs 0.38 vs 0.33), end-systolic stress (156 vs 149 vs 127 kdyne/cm^2) and pulse pressure/stroke volume (1.07 vs 0.80 vs. 67 ml/mmHg), and lower fractional shortening (0.34 vs 0.38 vs 0.36) and midwall shortening (0.15 vs 0.17 vs 0.18) than the NY-HTN and normals (all p < 0.01). Isovolumic relaxation time exceeded 100 msec – indicative of impaired diastolic relaxation – in 72%.

Conclusion: Thus, simple ECG criteria for LVH identify hypertensive patients with substantial abnormalities of LV structure and function as verified by echocardiography.

2:15

889-2 Doppler-Echocardiographic Parameters of Left Ventricular Diastolic Function in Patients With Mild Arterial Hypertension

C.M. Schannwell, F.C. Schoebel, M. Badiian, R. Marx, T.W. Jax, G. Plehn, M. Leschke, B.E. Strauer. *Clinic of Cardiology, Heinrich Heine University, Dusseldorf, Germany*

Background: The high risk of morbidity and mortality for the cardiac complications relating to hypertension leads to the conclusion, that the early determination of myocardial manifestation is of considerable importance in patients (P) with arterial hypertension. About half of the patients with arterial hypertension have normal ECG's and are asymptomatic. The aim of the study was to investigate, whether asymptomatic P with arterial hypertension and normal systolic left ventricular (LV) function already show a diastolic LV dysfunction.

Methods: In 23 P with arterial hypertension (age 50 ± 12 years; systolic blood pressure 178 ± 13 mmHg; diastolic blood pressure 98 ± 6 mmHg) and 18 control persons (C), age and sex matched, the following parameters of

LV diastolic function were assessed by Doppler echocardiographic analysis of the diastolic transmitral flow: the maximal early-(V_E) and late-(V_A) velocity of diastolic filling; the E/A-ratio; the acceleration and deceleration time (DT, m/s) and the isovolumetric relaxation time (IVRT, m/s). Furthermore the LV muscle mass (LVMM; g), the systolic shortening of the LV diameter (FS, %) and the relative systolic wall-thickness (WD/ESD) were calculated.

Results: No differences were found in the LVMM (187 ± 48 g vs 171 ± 54 g, ns) and the WD/ESD (0.86 ± 0.21 vs 0.85 ± 0.20, ns). P with arterial hypertension had a decrease in the early diastolic filling (0.53 ± 0.10 vs 0.79 ± 0.12 m/s, $p < 0.01$), an increase in the atrial filling (0.74 ± 0.13 vs 0.56 ± 0.12 m/s, $p < 0.01$) and a prolonged isovolumetric time of relaxation (123 ± 8 vs 87 ± 4 ms, $p < 0.01$) compared to C.

Conclusions: This study indicates that P with arterial hypertension have an abnormal pattern of diastolic filling. Doppler echocardiography is useful in identifying diastolic filling abnormalities in P with arterial hypertension. Even asymptomatic P with arterial hypertension and normal systolic LV function, suffer a LV diastolic dysfunction. A disorder of LV diastolic filling parameters occurs even before an increase of LV wall-thickness is documented.

2:30

889-3 Does Isolated Diastolic Dysfunction Exist in Hypertensive Patients With ECG Determined Left Ventricular Hypertrophy: The LIFE Study

K. Wachtell, V. Papademetriou, G. Smith, E. Gerdts, M. Nieminen, J.N. Bella, J. Rokkedal, R.B. Devereux. *Glostrup University Hospital, Denmark; The New York Hospital-Cornell Medical Center, NY, USA*

Background: It has been postulated that patients with hypertensive hypertrophic cardiomyopathy have isolated diastolic dysfunction and normal systolic LV function. Furthermore it has been shown that LV midwall mechanics maybe impaired in hypertensive patients with normal or supranormal LVEF, however whether impaired LV relaxation is related to depressed systolic contractility and midwall shortening is currently unknown.

Methods: We use echocardiography to evaluate 333 unmedicated hypertensive patients with LV ejection fraction >60% (average end-echo BP 164/91 mmHg) at enrollment in the LIFE Study: 239 (72%) had IVRT >100 msec, consistent with impaired relaxation.

Systolic midwall shortening and contractility were measured.

Results:

	IVRT ≤ 100 msec	IVRT > 100 msec	P
LVMI	117.7 ± 23.5	119.5 ± 26.0	NS
Relative wall thickness (RWT)	0.43 ± 0.005	0.45 ± 0.006	0.038
Midwall fractional shortening (%)	17 ± 1	16 ± 2	0.039
Circumferential endsystolic stress	140.3 ± 46.6	136.2 ± 39.7	NS
Stress adjusted midwall shortening	99.40 ± 12.9	95.80 ± 13.1	0.024

Conclusion: Patients with preserved LVEF and increased IVRT has significantly reduced LV systolic midwall function and as expected increased RWT.

2:45

889-4 Left Ventricular Structure and Function in Patients With Isolated Systolic or Diastolic Hypertension

V. Papademetriou, B. Dahlof, P. Narayan, J. Bella, E. Gerds, M. Niemenen, J. Nielsen, R.B. Devereux. *VA & GTMC, Wash. DC, Cornell U, NY, USA*

Background: Correlates of LV mass have been derived from either normotensives or pts with diastolic hypertension (DHT DBP >90 mm Hg). Data comparing pts with isolated systolic hypertension (ISH, SBP >140, DBP <90 mm Hg) to pts with DHT is lacking.

Methods: We compared LV geometry and function of 132 pts with ISH to 423 pts with DHT. All pts were LIFE participants & met ECG LVH criteria (Cornell or Sokolow-Lyon). Pts were evaluated off medication. BP was measured at time of echo.

Results: Pts in both groups had similar height, weight, body mass index and heart rate. Compared to pts with DHT, pts with ISH had lower SBP (164 vs 176, P < 0.001) DBP (81 vs 100 mm Hg, P < 0.000) and mean BP (108 vs 125 mm Hg, P < 0.000). Indexes of LV geometry were similar between the two groups (ISH vs DHT: LV mass 233/233 g, LVMI 125/123 g/m2, IVS 1.18/1.18 cm, PWT 1.11/1.10 cm, LVIDD 5.15/5.21 cm and LVIDS 3.35/3.43 cm). Pts with ISH had lower circumfrensial end systolic stress (153 vs 172 P = 0.002). All other indexes of systolic and diastolic function were similar between the two groups. Pts with ISH had lower total peripheral resistance (1833 vs 2119, P < 0.000). Using multivariate analysis LV mass correlated with SBP (p = 0.033), Doppler stroke volume (STVOL) (P < 0.000) and stress adjusted midwall shortening (MWS) P < 0.000). Relative wall thickness correlated with STVOL (P = 0.003) & stress adjusted MWS (P < 0.000) but not with SBP.

Conclusions: 1) Despite significant differences in SBP, DBP, mean BP, & TPR, patients with ISH & DHT had similar LV structure, & diastolic LV function; 2) SBP, STVOL & stress adjusted MWS are strong predictors of LV mass.

3:00

889-5 Cardiac and Hemodynamic Features of Hypertension Associated With Diabetes: The Strong Heart Study

J.N. Bella, R.B. Devereux, M.J. Roman, D. Fishman, M. Paranicas, E.T. Lee, R.R. Fabsitz, T.K. Welty, B.V. Howard. *Cornell Medical Center, NY, NY, University of Oklahoma School of Public Health, Oklahoma City, OK, Indian Health Service, Rapid City, SD and Medlantic Research Institute, Washington, DC, USA*

Background: Although the association of hypertension (HTN) with diabetes (DM) is well established, the cardiac features and hemodynamic profile of patients with DM and HTN have not been elucidated.

Methods: Echocardiograms were analyzed in 1,163 participants of the Strong Heart Study with neither DM nor HTN, 707 with HTN alone, 625 with DM alone and 922 with both HTN and DM.

Results: Patients with HTN + DM had larger left ventricular (LV) mass (gender-adjusted mean = 175 g) than those with HTN (mean = 167 g) or DM (153 g) or neither (149 g, $p < 0.001$ for all comparisons. Those with HTN + DM and those with HTN had higher cardiac output (CO) than NL (gender-adjusted mean = 4.9 ± 1.1 and 4.9 ± 1.2 vs. 4.7 ± 1.1 l/min, both $p < 0.001$). Participants with HTN + DM or with HTN had higher peripheral resistance (TPR) than NL (gender-adjusted mean = 1,759 and 1,753 vs. 1,662 dynes/s/cm $^{-5}$/m^2, both $p < 0.001$). Participants with DM had normal CO and TPR.

Conclusion: Adults with HTN + DM have greater LV mass but similar systemic hemodynamics compared to HTN without DM; both HTN alone and DM alone have increased LV mass.

3:15

889-6 Abnormal Left Ventricular Structure and Function in Pregnancy Complicated by Pre-Eclampsia

D. Degli Esposti, C. Borghi, A. Cassani, S. Crippa, S. Bacchelli, V. Immordino, S. Boschi, L. Bovicelli, E. Ambrosioni. *Department of Internal Medicine and IInd Department of Obstetric and Gynaecology, University of Bologna, Italy*

Pre-eclampsia (PE) is a clinical syndrome associated with an high risk of CV maternal complications both acutely and long-term. The aim of the study was to assess left ventricular (LV) structure and function in 25 patients with PE when compared with 29 normotensive pregnant women (NP) and 10 normotensive non-pregnant women (NN). Patients were studied by evaluating 1) Demegraphic characteristics, 2) systolic and diastolic blood pressure (SBP, DBP), 3) LV mass (LVM) and volumes (LVEDV, LVESV), ejection fraction (EF%), E/A ratio (E/A), iso-volumetric relaxation time (IRT), Cardiac output (CO), total peripheral vascular resistance (TPVR) by 2-D echo-Doppler evaluation, 4) Plasma levels of BNP, ANP, PRA by radioimmunoassay. PE showed an increase in SBP, DBP associated with significant abnormalities of both LV structure and function (* P < 0.05, † P < 0.01 PE vs NP and NN).

	BP	LVM	LVEDV	LVESV	EF%	E/A	ANP
PE	140/92†	204*	117.1*	40.7*	66*	1.3*	74.5†
NP	103/60	175	102.1	32.6	68	1.7	39.8
NN	114/62	146	102.9	29.5	73	1.7	

The present data suggest that PE can be associated with an increased LVM, an impaired LV systolic and diastolic function and a peculiar bio-humoral profile that could contribute to both acute and long-term CV complications in PE.